

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WOP12751A	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 01/ 00007	International filing date (day/month/year) 02/01/2001	(Earliest) Priority Date (day/month/year) 07/01/2000
Applicant SEIKO EPSON CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application, furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

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☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 01/00007

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L29/786 H01L21/336

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 365 080 A (YAMAZAKI SHUNPEI ET AL) 15 November 1994 (1994-11-15) figures 2,4,5 column 2, line 3 - line 34 column 2, line 67 -column 6, line 42	1,5,8
A		2-4,6,7, 9-12
A	US 5 382 537 A (NOGUCHI TAKASHI) 17 January 1995 (1995-01-17) figures 1-3 column 2, line 40 - line 48 column 3, line 4 -column 4, line 64 --- -/--	2,3



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

27 February 2001

Date of mailing of the international search report

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Polesello, P

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/JP 01/00007

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International Application No

P GB 01/00007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5365080	A	15-11-1994	JP 4267563 A	24-09-1992
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			JP 2000228361 A	15-08-2000
			US 6133073 A	17-10-2000
US 5498904	A	12-03-1996	JP 7288227 A	31-10-1995
JP 57099778	A	21-06-1982	JP 1584594 C	22-10-1990
			JP 2007177 B	15-02-1990
JP 10012886	A	16-01-1998	NONE	

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 July 2001 (12.07.2001)

PCT

(10) International Publication Number
WO 01/50538 A1

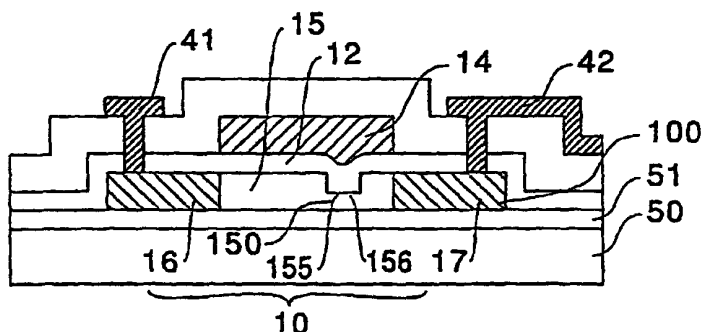
- (51) International Patent Classification⁷: **H01L 29/786**, 21/336 (74) Agent: STURT, Clifford, Mark; Miller Sturt Kenyon, 9 John Street, London WC1N 2ES (GB).
- (21) International Application Number: PCT/GB01/00007 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (22) International Filing Date: 2 January 2001 (02.01.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0000376.4 7 January 2000 (07.01.2000) GB (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- (71) Applicant (*for all designated States except US*): SEIKO EPSON CORPORATION [JP/JP]; 4-1, Nishishinjuku 2-chome, Shinjuku-ku, Tokyo 163-0811 (JP).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): YUDASAKA, Ichio [JP/JP]; Seiko Epson Corporation, 3-5, Owa 3-chome, Suwa-shi, Nagano-ken 392-8502 (JP). MIYASAKA, Mitsutoshi [JP/JP]; Seiko Epson Corporation, 3-5, Owa 3-Chome, Suwa-shi, Nagano-ken 392-8502 (JP). MIGLIORATO, Piero [GB/GB]; Epson Cambridge Laboratory, 8c King's Parade, Cambridge CB2 1SJ (GB).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A THIN FILM TRANSISTOR AND A METHOD FOR MANUFACTURING THEREOF



(57) Abstract: In TFT (10), the channel region (15) towering over the gate electrode (14) through the gate insulation film (12), the source region (16) connecting to the channel (15) and the drain region (17) connecting to the channel region (15) on the opposite side of the source region (16) are formed on the polycrystalline semiconductor film (100) on which island-like patterning is performed. An indented section (155) is formed on the surface of the channel region (15), and the section corresponding to the indented section (155) becomes the recombination center (150) which captures the small-number carrier (holes) because

the degree of the crystallization is low in the section corresponding to the indented section (155) due to shift from the optimum conditions at the time of laser annealing of the semiconductor (100). Thus the invention provides a TFT and its production method which enable the stabilizing of saturation current and improving reliability by improving the film quality of the channel region.

WO 01/50538 A1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/01/00007

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IPC 7 H01L29/786 H01L21/336

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

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8 document member of the same patent family

Date of the actual completion of the international search

27 February 2001

Date of mailing of the international search report

06/03/2001

Name and mailing address of the ISA

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Fax (+31-70) 340-3016

Authorized officer

Polesello, P

INTERNATIONAL SEARCH REPORT

International Application No
PCT/JP 01/00007

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP97/01/00007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5365080	A	15-11-1994	JP 4267563 A	24-09-1992
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			JP 2007177 B	15-02-1990
JP 10012886	A	16-01-1998	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
MILLER STURT KENYON
Attn. Sturt, Clifford Mark
9 John Street
London WC1N 2ES
UNITED KINGDOM

RECEIVED
 - 5 MAR 2001
 MILLER STURT KENYON

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WOP12751A	Date of mailing (day/month/year) 06/03/2001
International application No. PCT/GB 01/ 00007	International filing date (day/month/year) 02/01/2001
Applicant SEIKO EPSON CORPORATION	

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
 The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Audrey Rummery
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WOP12751A	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
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6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

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1
☐ None of the figures.

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International Application No

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✓ JP 57099778 A	21-06-1982	JP 1584594 C) JP 2007177 B) ✓	22-10-1990 15-02-1990
✓ JJP 10012886 A	16-01-1998	NONE	